DOCUMENT RESUME

ED 441 212 CS 013 959

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TITLE Literacy and Information and Communication Technology (ICT): A Discussion Paper. Working Papers on Literacy, No. 4.
INSTITUTION Centre for Literacy, Montreal (Quebec).
ISBN ISBN-09681034-6-4
PUB DATE 1998-00-00
NOTE 19p.
AVAILABLE FROM The Centre for Literacy, 3040 Sherbrooke Street West, Montreal, Quebec, Canada H3Z 1A4 (US$7 plus postage and handling). Tel: 514-931-8731, ext. 1415; Fax: 514-931-5181; e-mail literacycntr@dawsoncollege.qc.ca; Web site: http://www.nald.ca/litcent.htm.
PUB TYPE Opinion Papers (120)
EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Communication (Thought Transfer); Elementary Education; Foreign Countries; *Information Technology; *Literacy; Student Needs
IDENTIFIERS *United Kingdom

ABSTRACT

This paper touches on some of the major issues relating to information and communication technology (ICT) and literacy which until now have been treated as separate subjects. The paper argues for a convergence of the two and recommends that government agencies coordinate their visions instead of sending contradictory messages to teachers and students. Its focus is the first three key stages of the literacy strategy, touching ages 5-14, but the concerns it raises are familiar to anyone working in adult basic skills as well and are relevant beyond the United Kingdom. (Includes a glossary of acronyms and terms. Contains 15 references.) (NKA)

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# WORKING PAPERS ON LITERACY

**Working Paper No.4**

• Literacy and Information and Communication Technology (ICT): A Discussion Paper

*by Chris Abbott,*
*King's College, London*

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## WORKING PAPERS ON LITERACY

Working Papers on Literacy is an initiative of The Centre for Literacy. Through this occasional series of monographs, we hope to broaden perspectives and stimulate debate on literacy-related issues.

Some of the papers in the series are reprints of articles that have previously appeared in our newsletter, *Literacy Across the Curriculumedia Focus*, and have generated interest and requests for copies. Others are papers that we have produced as outcomes of our research projects.

The views expressed are those of the authors and do not necessarily reflect the philosophy of The Centre for Literacy. We welcome responses.

**The Centre for Literacy** is a resource and teacher-training project that provides linking, training, research, and information services to support and promote the understanding of literacy in the schools, the workplace and the community. The Centre connects teachers, trainers, researchers, human resource officers, policy-makers and media across Canada and internationally.

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ISBN: 09681034-6-4
$5.00, plus postage and handling

# PREFACE

This is the fourth paper published by The Centre for Literacy in its Working Papers in Litercay series which present new perspectives on literacy-related issues relevant to researchers, to practitioners and to policy-makers.

This paper was written in 1998 as an advisory document to the UK Qualifications and Curriculum Agency (QCA) which manages all aspects of the National Curriculum for schools and for vocational training.

Chris Abbott, Lecturer in Education at King's College, London, is a well-known teacher-researcher in Information and Communication Technology who co-authored the second Working Paper on Media Literacy, IT and the Teaching of English. In this new Paper, he has touched on some of the major issues relating to ICT and literacy which have until now been treated as separate subjects. He argues for a convergence of the two and recommends that government agencies coordinate their visions instead of sending contradictory messages to teachers and students. His focus was the first three key stages of the literacy strategy, touching ages 5 -14, but the concerns he raises are familiar to anyone working in adult basic skills as well and are relevant beyond the UK.

This Paper was included as part *of Literacy Across the Curriculumedia Focus*, Volume 14, No.1&2. It was the first publication of the paper printed with permission of the Qualifications and Curriculum Agency (QCA). All the acronyms and terms specific to the UK with (*) are explained in a glossary at the end.

**Dr. Linda Shohet**
Director, The Centre for Literacy
May 1998

# Literacy and ICT: A Discussion Paper

Chris Abbott
King's College, School of Education

**Introduction**

*In 1971 there were single, by modern standards crude, computer terminals in twelve secondary schools in the Inner London Educational Authority (ILEA). By 1989 every educational establishment in the ILEA had its own computers being used in a wide variety of curriculum areas with students of all ages. In the interim the technology has become established as an essential element of commercial, industrial, recreational and domestic life, and the acquisition of skills in its use has become unavoidable. However, in education, computers have a special role, for as well as being an often mundane tool used to control many processes and deal with repetitive data, they complement and extend intellectual activity. In a real sense they enable those who master their use to become better at solving a wide variety of problems because of their ability to organise and analyse large quantities of data; this data can be numerical, literal, visual or aural. This applies with equal force across the full range of ability and disability.*
(Esterson 1989)

*It may seem banal to begin by attempting to define what is meant by literacy, but this is unavoidable in view of the wide variety of definitions currently expressed in UK curriculum documents and in the wider education field.*

It is easy to forget quite how rapidly information technology has become part of the repertoire of tools available to teachers and learners in our schools, and equally easy to lose sight of the particular benefits these tools are able to provide. Almost ten years after the above statement was written, one wonders how often something should have to be stated before it has an effect; for the comments above have been repeated in different forms again and again over the succeeding years.

It is noteworthy that it is not only in the UK that governments and government agencies are taking advice about future literacies and the role of technology. A recent four-volume report for the Queensland Dept of Employment, Education, Training and Youth Affairs in Australia is entitled "Digital Rhetorics: Literacies and Technologies in Education - Current Practices and Future Directions." The case studies it describes are of great value in understanding current classroom practice in Australia; it would be helpful if such an exercise were to be commissioned for the UK.

## Defining literacy: Contradictory visions

**National Literacy Framework**

*Literacy unites the important skills of reading and writing. It also involves speaking and listening which, although they are not separately identified in the Framework, are an essential part of it.*
(DfEE 1998 p.3)

Literacy is really quite simple, at least as expressed in the National Literacy Strategy. But is this really all that is involved in the process of becoming literate at the end of the twentieth century? Despite the occasional mention of uses of IT * (and in most cases it is ICT * that is implied), this Literary Framework could as easily have been produced in 1898 as in 1998. It assumes that literacy is a fixed notion with static attributes and generally agreed identifiable features. The Glossary in the Framework contains definitions for hyphens but not for hypertext; explains mnemonics but not multimedia, and recognises renga and rap but not word processing.

It may seem banal to begin by attempting to define what is meant by literacy, but this is unavoidable in view of the wide variety of definitions currently expressed in UK curriculum documents and in the wider education field. It is no longer sufficient to define literacy by either of the descriptions offered by Collins Dictionary of English Usage, 1980: 1. *The ability to read and write*, or 2. *The ability to use language proficiently.*

**The National Curriculum**

The National Curriculum might seem a useful place to turn for a working definition of literacy for pupils in Key

Stages 1-3; yet there seems to be little certainty or guidance available there. The Curriculum Orders do not mention it at all, although they clearly deal with literacy explicitly, particularly through the decision to separate English into sections on Reading, Writing, Speaking and Listening. Whatever criticisms might be made of this model of literacy, it is clearly one with which teachers have been able to engage, which makes it all the more surprising that agencies such as the Teacher Training Agency (TTA)* have chosen to use other approaches.

**OFSTED*** (Office for Standards in Education)
OFSTED might have been expected to indicate concerns about the uses of ICT to develop literacy, but their efforts have tended to focus on one or other of these issues, with the Chief Inspector raising concern about literacy achievement, whilst his colleagues continue to publish material highly critical of schools' achievements in the area of the teaching of IT. These seem to be seen by OFSTED as being totally separate, rather than linked, areas of concern.

**Teacher Training Agency***
More recently, the Teacher Training Agency has produced draft curricula for Primary and Secondary Teacher Education in the area of English. Comments on literacy within these documents are more inferred than explicit.

In the Primary English teacher education curriculum, for example, we read much about reading and writing, about some theories of how language develops and about possible methods of teaching these; but the word literacy is nowhere to be found until we reach the section referring to pupils with learning difficulties and who may therefore have "difficulties in acquiring literacy skills." Under this section we note a requirement that teachers be taught how to use " Information Technology to foster the development of literacy skills." It is disappointing to find this reference linked only to learning difficulties, as if to suggest that pupils who are coping well have no need of IT. ICT is not mentioned or acknowledged at all, and it seems likely that the (anonymous) writer of the curriculum was unaware of this area.

The Secondary English curriculum follows a very similar pattern, so much so that it is tempting to suggest that the (again anonymous) writer has used ICT very well to load in the Primary document and redraft it using IT skills. Again, literacy as a term is not used, although sub skills associated with literacy such as reading and writing are mentioned. It is a fascinating revelation that the TTA is prepared to accept that one of the main ways in which language changes is "because of new technology," an area which has not previously been given such a high profile. The Secondary English curriculum does contain a section on the use of ICT to "support, develop and extend English teaching" and where the Primary document talks about IT, the slightly later Secondary one has moved on to consider ICT. There is no equivalent statement here on the use of IT (or ICT) for alleviating learning difficulties. One gets the impression that our anonymous author is learning on the job.

Very recently, the TTA self-audit materials for primary teachers in the area of Literacy has added to the complexity of advice available to teachers. The materials arrived in schools almost unheralded and represent a very different form of support than, for example, QCA/SCAA* exemplification. It remains to be seen whether or not this is a helpful development, and much will depend on the authority and inclusiveness of the model of literacy used.

**Non-government agencies**
If we look at other documents published recently we will find a more obvious recognition not just of the place of ICT but of its interconnectedness with literacy and changing notions of literacy. Although they are clearly outside the mainstream, writers

*In the Primary English teacher education curriculum, for example, we read much about reading and writing, about some theories of how language develops and about possible methods of teaching these; but the word literacy is nowhere to be found until we reach the section referring to pupils with learning difficulties...*

such as John Abbott (no relation of this author) of the 21st Century Learning Initiative have been calling for years for a rethinking of what literacy should mean, and how education should prepare young people to be literate:

*Our schools are very largely a product of the last two hundred years. They remain locked into a paper-and-pencil technology that shapes the whole learning experience... Now (traditional literacy education) worked brilliantly for about a hundred and fifty years, just so long as we had the sort of society where five or ten per cent of the population needed to be creative and ninety to ninety-five per cent needed to be good only at conformity. And it worked well according to the technology. But if you fell by the wayside, chances are that... it was not worthwhile turning back to pick you up.*
(J. Abbott 1998 pp.1-2)

Mainstream UK voices, too, have been attempting to raise these issues. The recent thoughtful BCS* document, *2000 and Beyond: A School Odyssey*, attempts to deal with these complex issues and has much to say that is appropriate, including an attempt to list those skills needed by a learner in the coming century:

*Learner skills for the 21st Century will include abilities to:*

- *Process complex information and use it to solve problems (define, locate, select, organise, present, assess);*
- *Relate knowledge to ever changing situations;*
- *Set and pursue their own learning goals;*
- *Become researchers;*
- *Become team workers.*

(Passey 1998 p.19 )

It is clear, then, at least to most individuals writing on the topic if not to the authors of some government documents, that literacy is more than just reading and writing. Literacy is linked to culture and society in complex and interlocking ways. Different cultures have different understandings of literacy and what it is to be literate; societies within particular cultures may also vary in these ways. Literacy is not a given phenomenon found in different settings, but a reflection of a particular society and culture. Cary Bazalgette, Education Officer at the British Film Institute, was attempting to grapple with this area when she suggested at a BFI Curriculum Conference in 1996 that to be literate was to "fully inhabit a culture." It is not possible to fully inhabit very many 21st century cultures, and certainly none in the developed world, without an understanding of, and capability for, the use of ICT.

**Literacy and I(C)T**

National perspectives on uses of IT for literacy and numeracy have been developing for some years: the National Council for Educational Technology (NCET)* organised a National Literacy and Numeracy Project in 1995. The resulting booklet (Abbott 1995) lists twenty-three ways in which IT can support these key skills. It is worth repeating these here, to avoid duplication as well as to recognise the work that has already been done.
[See BOX p.5.]

One of the timely reminders included in the Australian government documents is the importance of learning through play, and the role that the computer may have in this process:

*The computer environment supports all of the learning advantages of play which have been recognised in early childhood programs for many years... like play, the computer provides an environment free from the fear of being wrong; it is intrinsically motivating; they can set their own goals... and make up the rules.*
(Department of Employment Education Training and Youth Affairs 1997,Vol 2, p.54)

The documents also discuss other technologies which predate the computer such as the television and radio. Evidence from Australia is likely to be of particular value in this field, since that country has a long experience of distance education technology, whether it be short wave radio, or, more recently, Internet-based projects such as

BushNet and Skippy Net. The writers, academics from universities who were commissioned to gather and interpret the evidence, contrasted current technologies with previous ones such as television, and attempted to suggest how their arrival is changing notions of what it is to be literate.

*...new forms of literacy will be as significant as television and ... English teachers simply have to understand the fact that literacy involves multiple ways of meaning. [The Curriculum Co-ordinator in the school] is not worried if English teachers continue to privilege the printed text as long as they acknowledge and understand that other forms of text are also possible, important and must be included in the English curriculum.*

(Department of Employment Education Training and Youth Affairs 1997, Vol 2, p.69)

**Special Educational Needs and IT**

It is commonplace in policy documents to consider special education needs somewhere near the end of the document. However, where literacy is concerned, it is essential that this area of concern is brought to the fore. It is the basic right of all to become literate, and ICT can bring literacy to learners whose special educational needs would have previously denied them access.

For many users, the traditional keyboard may not be the best interface with a computer. There are many years of experience in the UK educational system of the use of overlay keyboards, on screen word banks, speech for reading and writing and other specialised ICT resources. In addition, the recognition in recent years that literacy is not solely concerned with the textual has also been of considerable benefit to those

*For many users, the traditional keyboard may not be the best interface with a computer*

## How IT can support literacy and numeracy skills

***Thinking, learning and exploring ideas***

- *Learners can use IT to communicate ideas.*
- *Learners can use multimedia to access information through the combination of sound, image, written word and movement.*
- *Learners at the emergent writing stage can use IT to develop their understanding of how writing works, and of the links between speech, reading and writing.*
- *Learners can be helped to develop appropriate vocabulary and grammatical choices by the use of specific kinds of writing software.*
- *Learners can use a spell checker to develop their own spelling strategies.*
- *Learners can develop clearer mental images of numbers if they see them displayed in various ways on the computer screen.*
- *Learners can use computers and calculators to produce many examples, to explore patterns and to make generalisations.*
- *Learners developing an understanding of place value can be helped by talking calculators.*
- *Learners can develop their expertise at estimation by using a range of tools.*

***Expressing and presenting ideas***

- *Learners can use overlay keyboards or on-screen equivalents such as word banks to write phrases and key words with a single press.*
- *Learners can gain privacy and a feeling of security when writing with computers.*
- *Learners (and their teachers) can use IT to keep a continuous record of individual progress, which can be used to inform teaching and learning.*
- *Learners can be helped to move from concrete to abstract representations of numbers by their use of IT.*
- *Learners who are bilingual can use multilingual software to help them utilise all their language resources.*
- *Learners who are experiencing difficulty in reading can be helped by hearing text spoken by the computer.*
- *Learners who have difficulty with reading and writing text can use IT- based pictures and symbols.*
- *Learners can write more extensively and for longer periods with IT.*
- *Learners who find spelling difficult can benefit from the use of word- processing programs.*
- *Learners can use IT to help them plan, and revise their writing.*
- *Learners can express ideas particularly effectively using multimedia.*
- *Learners can be helped to identify spelling and transcription errors in their writing, and to read their own work, by the use of talking word processors.*
- *Learners are highly motivated by the quality of presentation of their work made possible by IT.*

(Abbott 1995, pp. 4-5 )

whose literacy is best expressed and accessed in less traditional ways.

*The traditional media used for communicating with images - pencils, brushes, scissors, clay and so on - generally need considerable hand control and many students with physical disabilities do not have this. Until the advent of computer-generated many of these students relied heavily upon others to produce images.* (Rahamin, p.31)

Symbol processing, where pictures accompany word-processed texts, has more to offer a wider group of users than might previously have been expected. Although the most authoritative book on the subject recognises the first user of symbol processing as being the learner with severe learning difficulties, it also recognises that a wider group can potentially benefit from the resource.

*Much of the formal research on symbol use has been in its use as an aid to direct communication with non-speaking people or those with severe communication difficulties. The use as a support for indirect communication and the development of literacy... has yet to be studied through rigorous investigation.* (Detheridge, p.126 )

*Symbol processing, where pictures accompany word-processed texts, has more to offer a wider group of users than might previously have been expected.*

Many special schools have developed considerable expertise in the use and support of symbol-processing programs. This is just one of the areas of expertise which could very profitably be shared with mainstream schools, as special schools continue to take the role of specialist centre outlined for them in the recent Green Paper. (DfEE,1997)

## School approaches to using ICT

### Developing literacy and monitoring progress

Although it was not considered appropriate when the National Literacy Strategy was formulated, this Paper proposes to consider current school approaches to ICT through broad divisions dealing with reading, writing, and speaking and listening.

**Reading**

Skills of reading for information, thinking critically about what is being read, skimming and scanning and locating information have often been described as library skills. This term is unhelpful, based as it is around a notion of a geographical space where reading, or at any rate reading of an overtly educational kind, takes place. As we move into an ICT-rich age, characterised by some writers as post-geographical, these information-locating and handling skills are attaining new and greater significance.

It has been suggested for some years that reading is different when it takes place from a computer screen than when it is an activity based around a paper-based printed source. In particular, there is growing understanding of the complex nature of the reading process, a complexity not always mirrored in some national statements which seem to proffer a much simpler model.

We are learning much about the essential nature of the relationship between reader and screen, issues again which have been written about in the past but are only now being taken seriously by many of those for whom they are of most importance.

Some researchers have sought to illuminate how reading with ICT is different from reading from a fixed medium:

*There are two crucial differences between reading from a fixed medium such as a book, poster or letter, and interacting with an electronic text: the spatial dimension; and the nature of the interaction between reader and text.* (Abbott 1994 p.4 )

*(IT) is causing a further blurring of roles between author and reader..., as each reader reconstructs the texts they read. This has always been true of the reader, but it is even more the case now that IT has added new layers of interaction to the reading process. If the fixed meaning text ever existed, it will not do so for much longer.* (Abbott 1994 p.15)

It is important to consider both of these areas more carefully.

There are several issues of concern with regard to the spatial dimension. It is distressing to note the frequency with which young people, especially children in primary schools, are asked to work with computers at inappropriate heights and in uncomfortable conditions. It is recognised that chairs may not always be adjustable and mobile, but they can at least be selected to suit the size of the child. Teachers need to be aware of the need for keyboards to be at appropriate heights, for children to look down rather than up at monitors, and of the importance of minimising reflection on screens. Even where these issues have been well dealt with, however, there remains the essential difference between reading from a glowing vertical screen and from a horizontal paper source which is lit from above. In addition to the different luminosities and planes of view, there are even more vital differences of human-computer interaction, in relation to font size, amounts of text on screen, scanning and skimming facilities.

Facilities for skimming and scanning also relate to the difference between screen and paper reading. Scanning through text on screen is very difficult if that text is merely transposed from a different medium. It is essential that developers are encouraged to seek new metaphors and tools to enable users to skim differently as they read electronic texts. The recent developments within some Search Engines have provided useful pointers here, in so far as they sometimes use a degree of artificial intelligence to suggest a number of words which could be added to a search to define it further.

The Queensland document again reminds us that none of these technologies exists in a vacuum when it suggests that any computer technology is never just a resource, a tool - it also brings with it a context for learning and a culture for understanding (in this case) what you do to become a learner, and what counts as reading. (p.43)

**Writing**

One of the problems with the use of ICT for writing has been the continuing mismatch between the understandings of those who have been able to think deeply about the process [see BOX], and those harried and harassed teachers who have too often ended up using computers inappropriately. With writing, this has most often been through trying to manage a lack of resources by asking pupils to draft on paper and then type the result in to a computer, a process described in report after report by various agencies. That this is not a UK-specific issue is indicated by the following comment from the Australian report on a school where ... word processing [was] being used at all stages of text production, rather than as a mere "add on" - as is often found - where computers are used as a publishing tool for producing the final copy. (pp. 107-8)

**Moving text and effects on cohesion**

The apparently secretarial skills of cutting and pasting, or the ability to move blocks of text, are precisely those ICT skills which are most important if the technology is to help writers become more literate. Too often the emphasis has been on saving and printing, formatting and fonts; where moving, redrafting, deleting, and

*Writing with IT is more than just word processing*

*writing can be about sounds and images as well as words. There is also a broader range of programs available for writing than word processors alone: desktop publishing and multimedia packages can help learners to construct their writing and blend a range of resources to create different compositions. Databases can offer opportunities for writing, and for finding ways of classifying information in tabular form. Logo too requires a specialised and precise form of writing if the program is to work as desired.* (Tweddle 1994)

adding would have been of far more value. Proof-reading becomes different in nature when applied to a word-processed text. Missing or misspelt words can sometimes be replaced by automated tools such as spelling and grammar checkers, but the very possibility of moving blocks of text raises the possibility of locational errors and lack of coherent argument due to disrupted messages. Proof-reading of a word-processed text is therefore much more about cohesion and message than it is about the checking of the individual component words. If it does indeed lead writers to engage with their texts at this deeper level, this would seem to be a major argument in favour of word-processing.

**Spelling**

There is considerable confusion, however, regarding the role of ICT where spelling is concerned. Spell-checkers are appalling tools for young people who cannot spell, raising as they do false expectations in the writers who try to use them and suspicions in the minds of those in control of the education system. If spell-checkers actually checked spelling, things would be different; as it is, they merely compare words with lists of possible alternatives, and fairly inexpertly in many cases. Clumsy typists who can spell - many teachers in fact - may find spell-checkers very useful at a proofing stage, but there are far more relevant tools for young people who find spelling difficult.

*Anecdotal evidence suggests that most writers go through a transferring stage where they use technology much as they used to use paper, but that as they get more expert they then develop new strategies and approaches.*

Among these are symbol processors, where pictures accompany many of the most commonly typed words. These pictures can later be removed electronically, making this facility a useful temporary prop for many young writers. They have been particularly useful for those writers who confuse similar words such as "from" and "form," or "two," "too" and "to," all of which have different and immediately recognisable symbols

As ICT offers new writing environments, some of them very transitory, it will be important to ensure that young people adopt the sensible strategies of literate adults, and do not value correct spelling in all situations. Some ICT environments, helpfully, make this clear to their users, while also indicating that this is a case of education mirroring real-life practice:

*Email to the ETRACKS discussion list does NOT need to be run through a spell- checker before it gets sent. Focusing on the content of communication exchanged between primary students, we follow the philosophy of Sun Microsystems' Chief Executive Officer Scott McNealy: the content of Email is more important than perfect spelling and fancy formatting.*
(Department of Employment Education Training and Youth Affairs 1997 Vol 2, p.32)

**Drafting and redrafting: Focus on content**

Redrafting, then, is crucial to the process of writing with ICT, but it is still not well understood. This may be because it is very difficult for anyone to describe an essentially abstract process which cannot easily be observed or analysed. It is also an incredibly individual and personal process, to which different writers bring very different strategies.

Much less is known about the process of planning that goes on when writers draft, and the extent to which this is different on screen than it would have been on paper. Anecdotal evidence suggests that most writers go through a transferring stage where they use technology much as they used to use paper, but that as they get more expert they then develop new strategies and approaches.

Researchers such as Kerstin Eklundh at the Royal Institute of Technology in Stockholm have drawn attention to the potential problem for those drafting with computers of maintaining what she calls a 'global perspective.

*It has begun to emerge that the computer (or rather, the standard word processor on a small screen) encourages a local perspective of the text at the expense of a global one... while the word processor*

*encourages early on- screen drafting and continuous revision of the written text, it simultaneously hampers the ongoing evaluation of the changes with regard to global aspects of the written text. If this is true, it can result in a diminished ability on the part of the writer to control the overall organisation and coherence of the text as it grows longer.* (Eklundh 1991)

Her description of the difficulties will be familiar to many of her readers who, like her, have come to computers after a successful career in education without them. It may be, however, that the difficulties described will be much less real for more recent generations who have had access from the earliest stages of their development as writers. New writers will in future need to develop discourse and cohesion markers in their work in order to deal with the issue in ways appropriate to the technological tools in use.

Different kinds of writing, whether narrative composition, factual description or functional report writing, require understandings of register, vocabulary and audience. Some of these understandings are encoded and can be made explicit in the templates and style sheets that form part of much literacy-based software. These offer an excellent opportunity to develop knowledge about language through their use.

What must be avoided, as ICT attains ever greater prominence, is any move to return to the unfortunate stage which UK schools went through in the late 1980s, when writing with computers meant the ability to become an extremely inexpert typesetter. Across the country, young writers spent a few minutes writing followed by the rest of the lesson changing (or adding) fonts and sizes, adding borders and frames and unjamming the printer. We did not invest, as a nation or as individual centres for learning, in ICT for literacy in order to facilitate the electronic equivalent of colouring in the margins of a piece of inadequate writing to make it look better. If a document cannot be easily read, what it says and how it says it need to be changed, not the font in which it is printed.

Not all word processing requires the use of a full-scale computer, whether desk-top or portable. Both palmtops and portable keyboards have grown in popularity recently, and many projects have shown their value for classroom use. They have the potential to encourage a focus on content rather than presentation, and their smaller size is more manageable within many classrooms.

Young writers need to develop understandings and strategies which will help them to decide on the appropriate writing tool for a given situation, whether this be a computer, paper or portable keyboard.

**Keyboarding**

A particularly difficult area, and possibly a transitional stage through which only present generations will have to pass, is mastering the use of the computer keyboard, derived as it is unsatisfactorily from previous typewriter technology. Although it is a myth that the current UK and US keyboard arrangement was designed to slow down typists lest the letter levers become entangled, it does nevertheless present a barrier to literacy for some young people. It would be difficult to make a case for full-scale teaching of touch-typing to young people, even though this is routine, for example, in parts of the USA at Grade 3 or 4. On the other hand, it is painful in the extreme to watch a bright eleven-year-old trying to slow down her thoughts so that she can express them slowly enough on screen to be mediated through the only two fingers with which she is capable of finding the right letters.

It would be easy to merely state that the keyboard will soon be a thing of the past, but this would be both dangerous and, probably, mistaken. It may well lose its pre-eminence as the most used interface, but it will take many years for business and educa-

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tion to manage the use of speech input even when it is further developed. More crucially, the speed at which such input could appear on the screen could be just as problematic as the slow arrival of letters on some screens now. The most important skill, however, is knowing when to use a word processor, rather than being able to type at any particular speed.

Many professional writers have taken to word processing with alacrity, and it is salutary to note the way in which access to ICT changes the form of that writing. This is apparent in endless filler pieces about word derivation by journalists who had just discovered CD-ROM dictionaries, and in the similar rash of pieces when the World Wide Web became a standard researching tool.

**Collaboration**

Computers have always been recognised as powerful agents for collaboration, both between students and through their potential to enable teachers and students to learn together. Anecdotal evidence abounds of teachers learning alongside their students or even from them where ICT is concerned, and, even more surprisingly, not minding this. It is for this reason among others that many of those who have been most impressed by the potential of ICT to promote meaningful educational collaboration are the same people who have been most concerned by the arrival and promotion of Integrated Learning Systems which prohibit collaboration of any kind. This is because an ILS, at least in its classic form, constructs a picture of what it assumes to be a particular learner's difficulties based on the key strokes selected. For this reason, it is usual for the accompanying teacher handbook to stress that pupils should work alone and without discussing their work with others, even where this might be the normal mode of activity.

*Teachers found very early in their experience of computers in the classroom that these technologies could be powerful motivators and provokers of directed and useful talk.*

**Early writing and ICT**

Where word processing may not be as appropriate, at least in the sense of starting from a blank screen and putting down ideas from a void, is in the early stages of Key Stage 1(ages 5-8). At this stage, it will often be more appropriate to begin to develop capability with literacy technology by reading, rearranging and redrafting existing short texts. It is to be hoped that the current BECTa* project will address this area.

BECTa plan to evaluate the impact of ICT on KS1 pupils' literacy in inner city infant and primary schools. Pupils will be provided with access to word processing on low cost laptops, and these will be issued in class sets of thirty together with some for teacher use. It is hoped that the project will provide evidence on the impact of ICT on pupils' literacy; its impact on the teaching of the literacy hour; any improvement in home school links or parents' involvement in education and teachers' ICT skills. This is an extensive list of aims for a project which might have been better advised to focus on writing alone, but the outcomes will nevertheless be of great interest to the current debate.

**Speaking and Listening**

**Talk**

Teachers found very early in their experience of computers in the classroom that these technologies could be powerful motivators and provokers of directed and useful talk.

*(A) visitor would almost certainly note, (as thousands of teachers have already noted), a remarkable intensity of talk around the computer (or other equipment). This talk seems to be generated by the commitment of learners to their work, their active exploration of the potential of the technology in assisting their work, and the importance of collaboration in the completion of the task.* (Kemeny, p.1)

Although the Oracy Project* highlighted this use of technology, and the persistent influence of text disclosure software and other initiators of talk has remained current, there is less general awareness of the potential of ICT for talking and listening than for reading and writing.

*'Good talk' may, according to its context, be very fluent and organised or very hesitant, circumlocutory and without clear purpose. (When used to stimulate talk) the computer was described as a 'non-judgmental medium' and 'neutral and unthreatening: a 'facilitator,' an 'equaliser,' a 'constant and a 'resource.* (Kemeny, p.72-73)

**Speech synthesis and recognition**

A growing area of ICT is that of speech production and recognition. Speech can be generated by computers in two ways. Synthesized speech is very adaptable since it is capable of generating new and unexpected statements. However, since it relies on the merging of a basic set of morphemes, it is often indistinct and generally uninteresting to listen to. Digitized speech, on the other hand, can be of very high quality but is limited in its use as it is recorded as phrases and therefore only a finite number of known or predictable responses can be provided.

Speech production has become widely used in the form of digitized speech for talking stories and reference software, and as synthesized speech in talking word processors. Speech recognition is still in its very early stages, however, and raises considerable possibilities as well as a few concerns for the future. These are addressed below under Future Uses of ICT.

**Integrated Learning Systems**

Among the most publicized developments of recent years has been the arrival in the UK of Integrated Learning Systems. They have also been seen in Queensland, although the response there was more cautious than in the UK and did not involve a centrally-funded evaluation.

*...the program (Success Maker) is used sparingly.... The "dosage" depends on the student's individual needs, and it is always supplemented and surrounded by other activities. Both the Learning Support Teacher and (the class teacher) expressed significant reservations about the program, because of its decontextualised,* culturally irrelevant drilling. The *program claims to teach reading, but from my brief acquaintance I believe it rather tests it, and could also teach teachers and students a very limited idea of what reading involves... Clearly this is a programme (sic) which inspires differences and ambivalences in its various readers.*
(Department of Employment Education Training and Youth Affairs 1997, Vol. 2, p.41)

It is beyond the scope of this paper to discuss ILSs in any detail, although it should be recognized that there is continuing interest in this style of ICT use from politicians and school managers, even where class teachers are more skeptical. With several new products on the market and a major supplier about to launch an extensive totally British product, this is not an area where the debate looks set to disappear.

Whatever the future of ILSs, the concerns of many educators will continue to relate to the nature of the research purporting to show progress, the measures by which this progress is understood, the ability of the learner to transfer attainment to other contexts, the closed nature of most ILS systems, the lack of collaborative work, the cost, the cultural bias of some systems and the danger of de-skilling teachers who may have no clear role to play where ILSs are used.

**Future uses of ICT for literacy**
**Dangers of resource-led solutions and the need for integrated INSET**

ICT can be extremely beneficial for literacy development. In the next few years, there will be much more access to ICT in classrooms; but this does not necessarily indicate that literacy will therefore develop accordingly. Informed use is the key here, rather than a wholly resource-led scheme which assumes a purely causal relationship between machines purchased and test scores as a very approximate measure of literacy. To rely on such an assumption would be to share the worst mistakes of some writers in the past on issues such as ILSs. The Lottery-funded INSET *

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## *Students in remote areas use the net*

Breanna's (a student at a remote Bushnet school) pursuit of information is an interesting snapshot of a literary practice in a changing world. It is a social practice - a communication with an unknown adult beyond the classroom walls. Breanna takes this in her stride, despite being only eleven. And it is a cultural practice: she knows the genre of a formal letter to a stranger - although of course in other circumstances the immediacy of Email is changing the genre to something more informal, closer to talk. Breanna is learning how to take her place in this wider society with its techno-cultural ways of getting things done with words and data. She is becoming a member of a community of practice around technology and literacy - and this is also a matter of politics. Consider the power this child has relative to adults: the technology does have the effect of flattening out some hierarchies by providing easier access to those at the top. And consider the power this child has relative to her peers in other classrooms who are not being so apprenticed to this practice.
(Department of Employment Education Training and Youth Affairs 1997) Vol 2. pp 27-28

(inservice) for all teachers could address the need to assist teacher understanding, as could the Literacy Strategy INSET. Far more effective, of course, would be an integrated approach between the IT and Literacy INSET initiatives - the integration of ICT with literacy is, after all, what is being expected of teachers.

**Speech, ICT and classrooms**

There will be some very difficult issues to resolve in relation to the management and effective use of much greater speech production and recognition facilities. Headphones offer some solutions to the ever-more vocal classroom, but they militate against collaborative work unless they are linked through a junction box so that groups of pupils can work together. Use of such shared peripherals should become much more common if we are to avoid developing a nation of classrooms with children individually "plugged in" to their computers and isolated from the socially-constructed learning going on in their classrooms. Speech recognition and its effects have the potential to radically transform classroom practice, and research is urgently needed into the issues this will raise. There are also implications here for the boundary between speech and writing, an area under investigation by Professor Brian Street at King's College.

**The National Grid for Learning (NGfL)***

The National Grid for Learning has the potential to develop the C in ICT, and to ensure that real communication takes place with these technologies. It should not be seen, as the World Wide Web has too often and incorrectly been, solely as a resource from which to take information rather than as an agency through which to publish it. The most educational use of the NGfL will be triggered when it is used as a mechanism for delivering new audiences for children's writing, as a means of publications for teachers wishing to share ideas even at tentative draft stage, and as a national showcase for the best of what our literate young people can achieve. If the NGfL is authored solely by publishers, ICT companies and government agencies, it will have failed.

The evidence is already accumulating of what can be achieved through the meeting of resources, a student with something to say, and a teacher with the ICT capability to help her say it. [See BOX]

There are some important points here related to social and cultural practices, issues which have received much attention elsewhere (Street 1998). An emphasis on practices rather than products can very helpful, concentrating as it does on exactly what is happening rather than on the products of those events. All the metaphors related to the

use of the Internet and associated media tend to portray linear ideas such as an Information Superhighway or a journey from one place to another. The metaphor for the NGfL should be of a literate community, a community of learners who share what they are writing, read the work of others, and publish to wider and larger audiences. It is unfortunate that the word Grid was chosen, denoting as it does a widely distributed series of cells, rather than a word which could have stood for this coming together, such as the National Centre for Learning. Presumably it is still not too late to lose a serif from the G in the NGfL logo.

**What support is required?**

As has already been indicated, it will be essential if ICT and literacy are to be as mutually beneficial as they could be that training is not delivered to teachers in the form of totally separate and unconnected INSET experiences. This would offer an implied message totally at odds with the overt one in many current curriculum documents. It is also essential that the current agencies involved in areas of ICT and literacy - QCA, BECTa, TTA, OFSTED, National Literacy Strategy - deal rapidly with the diffuse, diverse and confusing statements on literacy which are offered in their various publications

Any attempt to move too rapidly to a totally on-line support model would be extremely ill-advised. Although it is possible that the NGfL will become in time the main source of teacher support, making it available to teachers is only the first part of a process of re-education which will take, for some teachers, much longer than the four-year Grid implementation schedule. Paper resources and printed support, such as the well-received QCA/SCAA exemplification materials, will continue to be needed but can be enhanced in future by providing on-line equivalents. These on-line parallel texts can be updated often and regularly, reflecting new developments, thus making them more useful than the paper equivalents, and sending a positive message about ICT and Literacy to teachers. An example is seen in the online materials for the Literacy Hour which change every month to reflect current themes and uses.

As long as keyboards remain a major input device for computer users, it is insupportable to continue to have no strategy for increasing competence in this area. Typing tutor programs should, at the very least, be made available through the NGfL to teachers and students, and their use could be encouraged by a national scheme of automated awards or certificates for progress made.

**Implications for future of ICT Curriculum Orders***

Future ICT Curriculum orders must address and resolve the current confusion between IT and ICT. Arguments about the relative merits of each term are ultimately sterile and waste a lot of time; if ICT is the most appropriate term then it should be officially adopted and defined by QCA, as the most appropriate agency, and accepted by the others. Maintaining both terms, with IT as the subject and ICT as the cross-curricular use, may have been a useful stopgap response, but cannot continue to be justified. With the arrival of extensive communication facilities, IT has totally changed and can never be separated in future from ICT.

As communicative uses of ICT become a much greater part of classroom practice, there will be difficult issues of discourse with which to engage. Where in the past, classroom discourse has all happened within that geographical setting, this will no longer be the case. Collaborative work may be done with the pupil in the next seat, or with a pupil sharing similar interests in another school or even another country.

Discourse may therefore be interrupted by time zone or other dislocations, and cohesion of argument may well suffer, as has been alluded to in the section on writing. Pupils will need to learn to deal with these multiple and multiplying

*As long as keyboards remain a major input device for computer users, it is insupportable to continue to have no strategy for increasing competence in this area.*

## Web design and youth

[Interview with a thirteen-year-old boy in an independent East Midlands school, in September 1997, for a research project at King's College.]

... I spent my Easter holiday putting together the school web page...staying with the school, there's school shields, school picture, and then the index..and finally at the bottom all the official stuff...

**What sort of brief did the school give you about what they wanted..?**

I told them what they wanted...

**How much did they accept your suggestions?**

Hundred per cent... Every thing I said went. I did get things to put on which we might not have put on before but everything that I said went.....you see I've got myself up in a position where I edit the school Gallery, I edit the school magazine, I do the web page, I set up an IT room for the school. So if I think something would be good for the school, and they can't think of anything why not to put it on, it'll go on. They haven't really got an objection.

**Is the school actually using the fact that they have a web site?**

I still haven't seen a formal press release. I've been urging them to go tell the (local paper) you're on the web, get them to come down here, get a few photos of the kids using the web. They don't have any proper web machines, they've got little 486's... But that's what they should do, but I haven't seen that happen. But it goes in the magazine, it goes in the Gallery etc. So everything that I do, it gets put on. And I think a lot of the parents are now aware that the school has a web page.

**Who do you see as the prime readership for those pages?**

Prospective parents. I haven't actually got links to (the DfEE) performance tables but... we've got 100 per cent GCSE pass rate this year and I'm going to have to put that on... GCSE results for the past grades, the A level results for the past few years... Bit of text and then a little Excel graph. National average, our school's result...and the 1997 results aren't up there yet, but I have been pestering... And that's the school pages. We've got a little logo at the bottom, which takes you back to the home page.

**What would you hope would happen in the future to that page...?**

I couldn't see anybody else actually doing it. I don't see anybody - there's nobody really - I'm the only person that does these things in my school. I'm the only one that does any kind of media for this school. I do my little bit, like Said... But the Development Director whose job it is, I don't see doing (it)....[She] can't use a computer program. She really just writes articles for the newspapers and that's it.

literacy events, and to make use of them for sound educational purposes, as will their teachers. Problems of cohesion also occur as writers get more expert in their use of word processing tools such as the ability to cut and paste.

Young people are already, in many cases, expert users of ICT and often have firm views about what it can offer to education, and the extent to which schools are taking advantage of this. [See BOX.]

This boy, insufferably arrogant although he may sound, has recognized some of the changes in literacy that ICT has produced, and he is concerned that the teachers at his school have not reached that level of understanding. It is the purpose of education to be aware of these changes rather than have them pointed out by students, and it is essential that future Curriculum Orders start from where that student is, and not from where his school seems to be stagnating. Above all, it is vital that Curriculum Orders take note of the tentative and unformed nature of the present range of ICT tools.

We are in the very early years of the use of transforming technologies which are still in many cases deeply flawed and need much greater development. What we see now is a glimmer of the potential, an inkling of the range of literacies which are becoming possible as ICT begins to affect all learners.

Perhaps the last word should be left to Susan Hilligoss and Cynthia Selfe, who concluded a compilation of articles on Computers and Literacy with these words:

*...it is possible that computers (or some related word like hypermedia) may become a linguistically "unmarked" term for devices of reading and writing, even for text, as paper, pen and type have been. That eventuality is to be neither desired nor avoided. What we have here named as knowledge will evaporate into the tacit practices of any number of fields, with both losses an gains for us.*

*and, more important, for those who come after us. No matter. We constantly find ourselves in the position not of archivists but of their predecessors... We can never inscribe all we do .... nor can we control the knowledge of those who follow, but, with effort, part of what we learn they may know.*
(Selfe and Hilligoss, p. 340)

## Glossary of acronyms and terms used:

**BCS** - the British Computer Society

**BECTa** - the British Educational Communications and Technology Agency, the government agency dealing with all aspects of ICT in education in UK.

**Curriculum Orders** - the detailed statements of the subject matter that must be taught in each of the ten subjects at each Key Stage. This will be revised in 2000 and is expected to be considerably reduced in detail so that it becomes much more general and less specific.

**DfEE** - Department for Education and Employment

**INSET** - In-service education of teachers

**IT/ICT** - There is no definitive statement of difference between these two terms and different agencies take different approaches - but QCA people have said that IT is a subject with a body of knowledge while ICT is a methodology or way of working. Broadly, this is Chris Abbott's view as well.

**Key Stages** - The four sections of the UK curriculum are KS1: 5-8 yrs; KS2:8-11 yrs; KS3: 11-14 yrs: KS4: 14-16 yrs.

**LEA** - Local Education Authority, responsible for all state-run schools in a geographical district.

**NCET** - National Council for Educational Technology - now incorporated into BECTa.

**NGfL** - National Grid for Learning - web-based resource area being developed for education by the DfEE and BECTa

**OFSTED** - Office for Standards in Education - the Government-appointed body which inspects all schools on a regular basis and issues reports on the quality of teaching found.

**Oracy Project** - a previous short-term DfEE project designed to raise the profile of Oracy in the curriculum.

**QCA/SCAA** - the Qualifications and Curriculum Agency (previously the School Curriculum and Assessment Authority) manages all aspects of the National Curriculum for schools and for vocational training.

**TTA** - Teacher Training Agency - the government agency which controls all aspects of initial and in-service teacher education

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